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*MOSQUITOES FOUND ABOUT GAINESVILLE, FLA.

By U. C. LOFTIN

PART I. SPECIES, BREEDING PLACES, MOSQUITOES AND DISEASE, NATURAL ENEMIES, PREVENTIVES

Mosquitoes have been known to man since time immemorial, but so far as we know, there has been only one man who was thankful for their existence. In the Old Testament we find that when King Saul was seeking David to slay him, he was asleep in a cave one night when David entered and secured his spear and a bit of his robe. In the Talmud version of this story, we are told that King Saul was guarded by Abner who had stretched himself across the entrance of the cave so that David had to crawl over him to enter. As David was leaving, Abner turned and threw his leg over David's ankle. If David moved, Abner would awaken and kill him; if he waited, day would come and death would follow. The Lord seeing David's predicament, sent a mosquito to bite Abner and cause him to move his foot, thus freeing David who went away thankful and praising God for sending the mosquito. Since that time, man has considered them a nuisance—not only this, but the more recent discoveries have shown them to be transmitters of disease and one of the greatest menaces to public health with which we have to contend.

Mosquitoes are found everywhere, from the frozen arctic regions to the depths of the tropical jungle. When Linnaeus, in 1758, published his catalogue of all the animals then known to exist, he recorded only six species of mosquitoes. Theobald

*Thesis presented at the Univ. of Fla., in 1913, for the degree of Master of Science.

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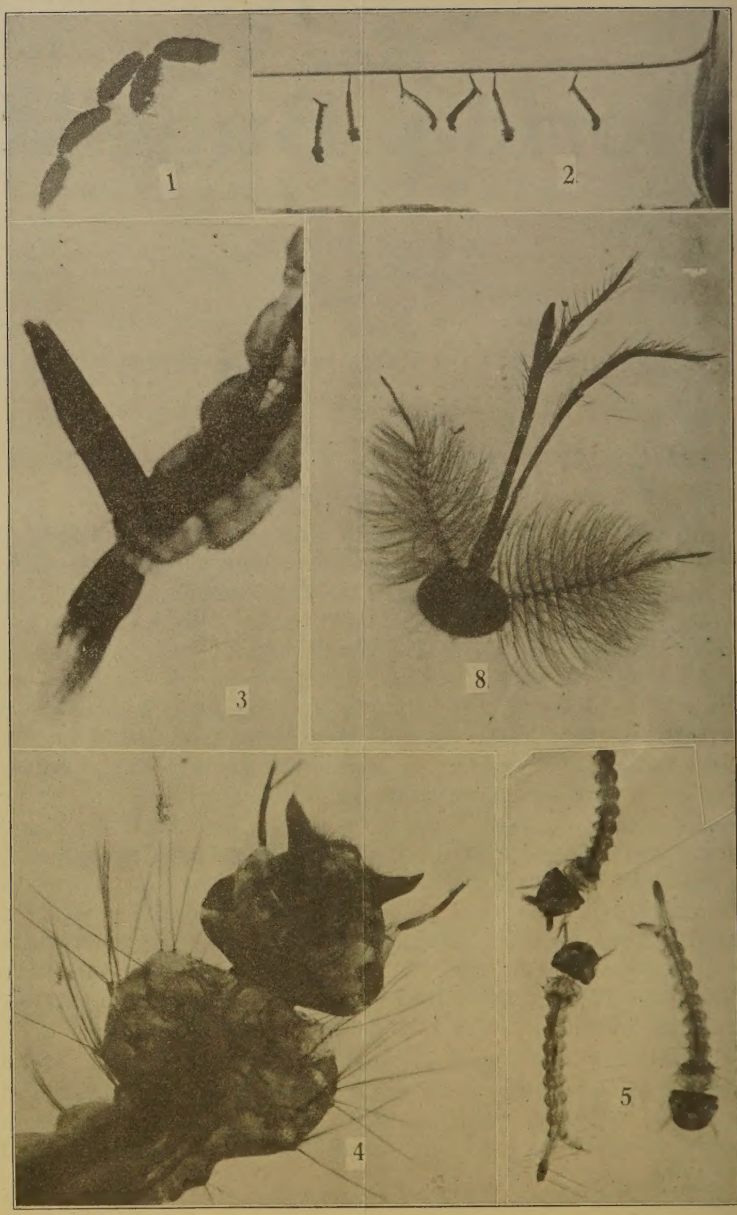

PLATE I. *Culex quinquefasciatus.* (1) Egg rafts (enlarged). (2) Larvae (Wigglers) showing long anal or respiratory tube and oblique angle of suspension from surface of water. (3) Respiratory tube of larvae (greatly enlarged). (4) Head end of Larva (enlarged). (5) Larvae (enlarged). (8) Head of adult male showing plumose antennae and long palpi.

Original numbering of figures has been retained but Figs. 6, 7, 11, 14 and 15 have been omitted.

(1901), in his Monograph of the Culicidae of the World, listed about six hundred species, over sixty of which are recorded from the United States.

Naturally the first question that arises is, "Where do all these pests come from?" "Where do they breed?" It is now known that, with a few possible exceptions that do not occur here, all mosquitoes are aquatic in their younger stages. They live under the surface of the water but are true air-breathers without gills and must come to the surface for air. The air is taken in through the trachael tube which ends in the prolongation of the eighth abdominal segment, called the anal or respiratory tube. This tube is pushed through the surface film and a supply of air drawn in. Later, in the pupal stage, they breathe through two trumpet like tubes arising from the top of the thorax. The food of these larvae consists of bacteria, slimes, and decaying animal and vegetable matter, while a few are carnivorous. Different species breed in different kinds of water. Some will breed only in salt water, others in clean fresh water, while still others prefer polluted sewerage. In studying the mosquito question for extermination, it is important to know where and what kind of breeding places we have to contend with.

The following species have been taken, but there may be others that occur rarely:

Culex quinquefasciatus Say.
Anopheles crucians Wied.
Anopheles quadrimaculatus Say.
Stegomyia calopus Meig.
Psorophora ciliata Fab.
Psorophora floridense D. & K.
Megarhinus sp.?

Following is a brief description of these species:

CULEX QUINQUEFASCIATUS

Eggs.—This is the commonest species. The eggs are somewhat conical in shape and are laid on the surface of the water with the large end down. They are placed side by side and stuck together, forming a boat shaped raft (Fig. 1) of six to thirteen rows with forty eggs in a row, each raft containing from one hundred to four hundred eggs, with an average of one hundred and seventy-eight and four-tenths (Davis 1906). They are white when freshly laid, but soon turn grayish brown to black as seen from above, and silvery grayish below, due to a film of air which protects the eggs from the water. They usually hatch in from sixteen to twenty-four hours but they have remained unhatched in the laboratory for ten to twelve days. A few hours desiccation kills them. (Mitchell 1907.)

The eggs are usually laid at night or early morning, but I have observed

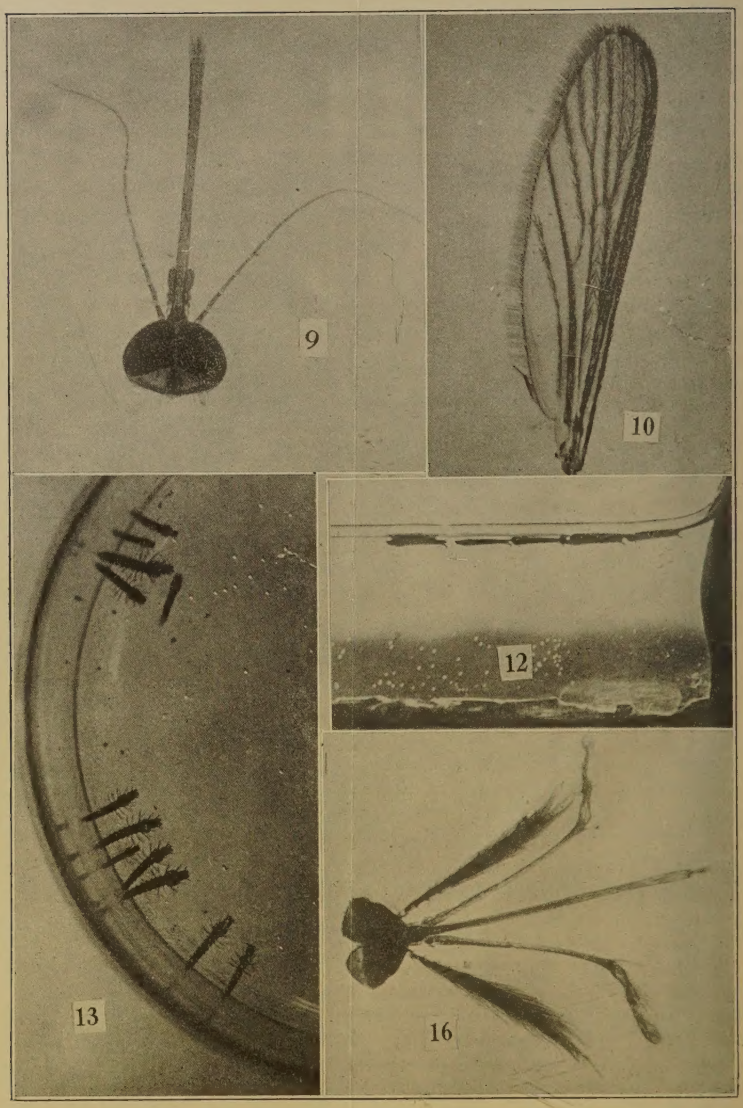

PLATE II. (9) Head of adult female *Culex quinquefasciatus* showing pilose antennae and short palpi (enlarged). (10) Wing of *Culex quinquefasciatus*. (12) Larvae of Anopheles resting at the surface of water. (13) Larvae of Anopheles seen from above. (16) Head of adult male Anopheles (enlarged).

a female finishing a raft as late as 9:30 a. m. on a bright day. Males and females bred from larvae in the laboratory, have been confined in a breeding

cage for four weeks with a diet of fresh and dried fruit, but never have any eggs been deposited unless they were fed a meal of blood. Smith (1908) states that blood is the preferred food but is not a necessity and he has had females ovipost on a diet of foul water.

Larvae.—The larvae issue from the under side of the eggs. They have a long anal tube and float below the surface at an oblique angle (Fig. 2). The anal tube is about five times as long as wide, tapering rapidly toward the last half and bears four tufts (Fig. 3). The antenal tufts are set in a notch on the apical half, and are never over half the length of the antennae (Fig. 4).

The larvae (Fig. 5) vary in color from light, almost colorless, to greenish, and nearly black, depending upon the food. Larvae that have had scant food supply and developed slowly seem to be lighter colored than those that developed quickly. The larval stage lasts from seven days (Howard 1902) to several months. Smith (1908) has found the time in New Jersey to vary from one to three weeks depending upon the temperature and the food supply. The time required here was about two weeks in September and October, but was probably longer during the winter. In one instance, in May, they required only seven days to pupate while they have been kept in the laboratory from October twenty-first to February third and then died before pupating. The usual time required in the laboratory was four or five weeks.

The food consists of minute algae, bacteria, and decaying vegetable material. They browse over the vegetable material and eat the bacteria, slime, etc., that accumulates there, as well as some cellular tissue, but no animal tissue has been found in the stomachs examined (Johnson 1902). They have frequently been observed nibbling over the bodies of the larvae that had died, and in one instance the larvae of *Citheronia regalis**, but they may have been eating only the bacteria.

Pupae.—The pupae are easily distinguished from the larvae by their enlarged head and thorax. The trumpet like breathing tubes which are over six times as long as wide (Mitchell 1907), arise from the dorsum of the thorax. The pupal stage lasts from two to several days.

Adults.—The adults are small to medium sized individuals, usually light brown in color, though varying from light green to almost black. The abdominal segments are banded basally with white, usually conspicuous, but sometimes indistinct. They rest upon the wall in a horizontal position, with the head upward, and the body held parallel to the wall.

The scutellum is three lobed with the posterior end of the thorax bare. The palpi in the males are as long as the proboscis, but in the females less than one-half as long. The antennae of the males (Fig. 8) are thickly covered with hairs, but in the females, sparsely covered (Fig. 9). The front claws of the males are toothed, but single in the females with the tarsi uniformly blackish. The veins of the wings (Fig. 10) are uniformly covered with narrow scales. The petiole of the first submarginal cell is about one-fourth the length of the cell. They do not fly far, but several hundred yards may be covered when seeking for food or breeding place. (Smith 1908.)

The length of life of the adult is very variable. In the north the im-

*The Regal Moth.

pregnated females hibernate over winter and then may live several weeks and lay two or three times. They have lived for five weeks in confinement in breeding cages (during April and May) on a ration of dried fruits.

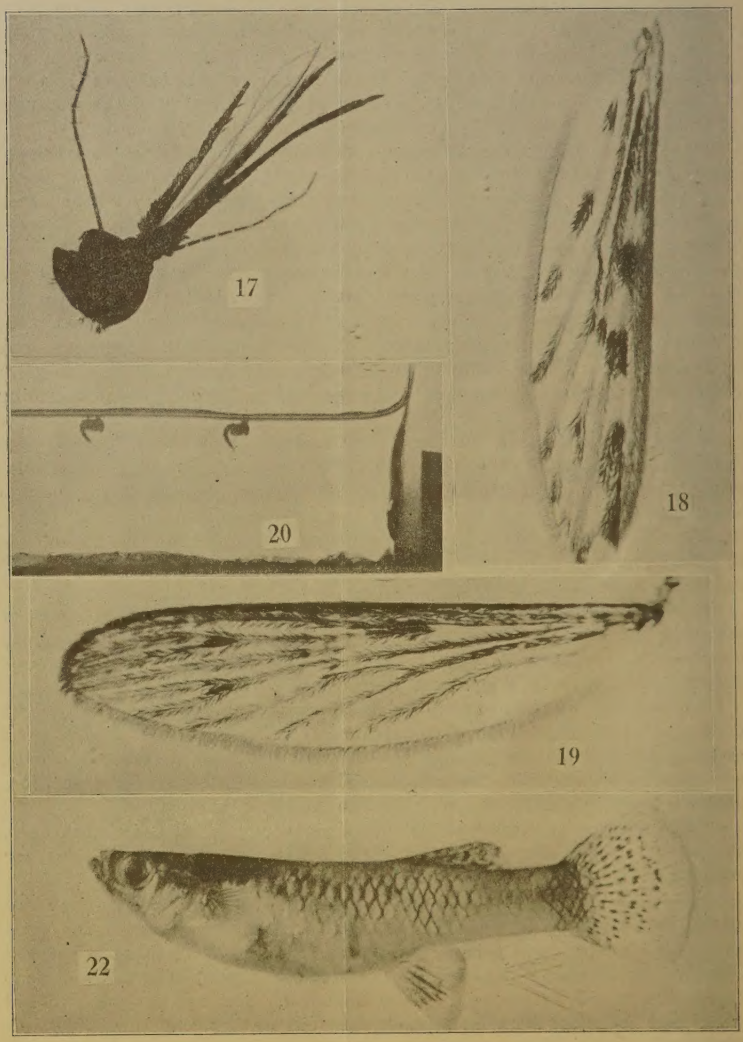

PLATE III. (17) Head of adult female Anopheles (enlarged). (18) Wing of *Anopheles crucians* (enlarged). (19) Wing of *Anopheles quadrimaculatus* (enlarged). (20) Pupae of *Stegomyia calopus* suspended at surface of water by the breathing tubes on thorax. (22) Top Minnow *(Gambusia affinis)*.

BREEDING PLACES

Larvae have been taken in holes, puddles, wells, buckets, barrels, stump holes, basements of buildings, wagon ruts, marshes, ditches, cess-pools, and dishes inside or outside of buildings.

ANOPHELES

Eggs.—The eggs are boat shaped, one side being flatter than the other, and are covered with a fine reticulated membrane. They are not stuck together in rafts, but float singly or in groups upon the surface of the water. They usually hatch in thirty-six to forty-eight hours, but they may remain viable for several months (Mitchell 1907). They have remained unhatched for fifteen days in the laboratory.

Larvae.—The larvae are easily distinguished by their resting position in the water (Fig. 12). They have a very short anal tube and the body is always held parallel to and touching the surface, and are supported by the anal tube and the racemose hairs (Fig. 13) along the sides of the body indenting the surface film. (Berkley 1902.)

The color varies from very light green to dark brown, almost black. There are often whitish markings on the thorax and abdomen, but these are very variable and often entirely lacking. The length of the larval stage under favorable conditions, may be as short as six days (Howard 1902), but is often much longer. *Anopheles quadrimaculatus* has remained in this stage for two months in the laboratory.

The larvae feed at the surface and will swallow any minute floating particle.

Pupae.—The pupae resemble Culex very much, but they have shorter and broader respiratory tubes which are placed near the middle of the thorax. The length of the pupal stage is longer than for Culex, varying from five to ten days (Howard 1902).

The eggs, larvae, and pupae of the two species we have are very much alike, and are not easily distinguished.

Adults.—The adults of this genus are easily recognized by the position in which the body is held when at rest. It is held at an angle to the surface, which gives them the appearance of standing on their heads. The body of *A. crucians* is usually held at an angle of sixty to seventy degrees, while *A. Quadrimaculatus* usually forms an angle of forty-five to fifty degrees. When there is a breeze blowing, they have been observed clinging to the window screens in the position assumed by Culex, and once or twice when the wind was blowing hard, the body was pressed against the screen. When resting, the hind feet usually point backward and are held a little below the level of the body.

The scutellum is convex behind and the proboscis is straight. The palpi are as long as the proboscis (Figs. 16 and 17) and the claws simple in both sexes. The wings are spotted with white and black scales, but the front margin is wholly black scaled.

Anopheles crucians can be distinguished from *Anopheles quadrimaculatus* by the spots on the wings. In *A. crucians* (Fig. 18) the last vein is white scaled and marked with three black spots; while in *A. quadrimaculatus* (Fig. 19) the last vein is wholly black scaled.

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AN UNDESCRIBED TELEONEMIA FROM FLORIDA AND JAMAICA (HEMIP.)*

By CARL J. DRAKE

Since the publication of "The North American Species of Teleonemia Occurring North of Mexico" (Ohio Journal of Science, Vol. XVIII, pp. 323-332, 1918) the writer has received through the kindness of several workers many specimens of *Teleonemia* from North America and the West Indies. The new species described herein is the same form as listed by Van Duzee in "Notes on Jamaican Hemiptera" (Bulletin of the Buffalo Society of Natural Science, Vol. VIII, pp. 3-77, 1908) under the name *Teleonemia scrupulosa* Stal. The insect is named in the honor of Prof. E. P. Van Duzee.

Teleonemia vanduzeei new species.

Antennae moderately long, slender, sparsely pilose; first segment a little stouter than and subequal in length to the second; third segment moderately long, slender, about three times as long as the fourth; fourth segment subequal in length to the first and second conjoined. Head armed with five moderately long, porrect spines, the spines arranged as in related species. Length, 3.15 mm.; width, 1.2 mm.

Pale testaceous or light brownish testaceous, with dark brown markings. Pronotum brown, slightly tinged with ferrugineous, tricarinate, lateral carinae slightly diverging posteriorly; paranota distinctly uniserate, not quite reflected back against the pronotum proper; carinae rather thin, all strongly raised and with a single row of rather large areolae, the median carinae raised anteriorly and projecting subangularly over the base of head. Elytra constricted a little beyond the middle, with dark brown to nearly black markings in discoidal and sutural areas; costal and subcostal areas uniseriate, the areolae rather large; sutural area with the color marking tending to form a transverse band a little before the apex; discoidal area bounded

*Contributions from the Department of Entomology, The New York State College of Forestry, Syracuse, N. Y.

by strongly raised nervures, faintly pubescent, mostly dark brown to nearly black in color. Antennae brown, the apical segment somewhat darkened. Body beneath brown, usually tinged with ferrugineous. Legs brown, the tips of femora and bases of tibiae, and the tarsi dark. Rostrum extending slightly beyond the meso-metasternal suture. Rostral sulcus open behind.

Akin to *T. scrupolosa* Stal, but readily separated from it by the longer and much less pilose antennae; the pubescence in the discoidal area is almost entirely wanting. Twelve specimens. Florida: Crescent City, September 7, 1898, Otto Heidemann Collector. Jamaica: Mandeville, Kingston, January to April, 1908, E. P. Van Duzee Collector. *Type* in my collection; *paratypes* in the collections of E. P. Van Duzee, Cornell University (late Heidemann Collection) and of the writer.

THE NATIVE HOST-PLANT OF THE CAMPHOR THRIPS.

(Cryptothrips floridensis Watson.)*

The camphor thrips was first collected by Mr. W. O. Richtman, on the camphor farm at Satsuma in November, 1912 (see An. Rep. Fla. Ag. Exp. Sta. 1913, p. lxvii). Subsequent search thruout Florida revealed its presence in many places, but by no means in all those investigated. This discontinuous distribution and our failure to find the insect on any plant except camphor, which is an introduced plant, finally led us to the opinion that it is an introduced pest, perhaps brought to us on camphor. This opinion was strengthened by the receipt of a single poor specimen of an adult and several larvae of apparently this species collected on camphor in Ceylon (An. Rep. Fla. Ag. Exp. Sta. 1915, p. lxxi).

The first evidence that pointed to an opposite conclusion was gathered on a visit to the DuPont Camphor Farm at Waller last July. The insect was not noticed in this plantation until spring of this year and one of the first centers of infestation was near a "bayhead" in an out-of-the-way section of the farm. This pointed to the bayhead as a possible source of the insect. Accordingly the native vegetation in the bayhead was subjected to a vigorous sweeping and a single adult of the camphor thrips was captured. Altho this pointed strongly to the bayhead as the home of the insect, there was a possibility that the thrips caught there had strayed into the bayhead from neighboring

*Paper read before the Florida Entomological Society Sept. 29, 1919.

camphor. If the insect was native to the bayhead what was its foodplant there? Those of you who are familiar with our bayheads know that the vegetation there is a bewildering mixture of a large number of species of shrubs, herbs and grasses with no apparent order or zonation. It was therefore difficult indeed to determine the exact host plant. Because it belongs to the same family as camphor we naturally suspected the bay itself. There are two entirely unrelated genera of plants that are commonly called "bays" in Florida. One is a certain small species of *Magnolia* of the magnolia family and the other is *Persea*, or *Tamala*, of the laurel family, the family to which camphor belongs. It was, of course, the latter only that was suspected of possibly being the host plant of the camphor thrips. However, a thorough beating of this plant at Waller failed to reveal the presence of the thrips. A fortnight's vacation spent at Daytona Beach afforded an opportunity to study the bay there, *Tamala littoralis* being one of the most abundant trees on the island. The very first tree investigated yielded many of the camphor thrips, both adults and larvae. Further investigation showed that the thrips was generally distributed thruout the island. It was found on trees miles from any camphor and in isolated places to which the opportunities of catching a ride must be few. On only a few trees, however, was the infestation heavy. It has since been found on the same species of bay at Orlando.

Following the discovery of this thrips on bays and its identification on structural grounds as *Cryptothrips floridensis*, live thrips were taken to the laboratory and transferred to camphor. Vice versa thrips collected from camphor were transferred to bay. In both cases the insects fed with avidity on the new host. They seemed to have no choice whatever as between camphor and bay, provided the leaves or twigs were of an equal age. We have not as yet had an opportunity to study their behavior in the field where bays and comphor are growing side by side.

There can then, it would seem, be no doubt but that the native bays of the genus Tamala are the native hosts of the camphor thrips which is a native insect that has spread to the camphor wherever opportunity offered. Its uneven distribution over the state and its absence from many camphor hedges and trees is to be explained by the remoteness of the uninfested trees from bays and lack of transportation facilities.

These developments lead to a reexamination of the specimen from Ceylon, for if the insect is a native of Florida, feeding on

the wild bays, it would seem unlikely that identically the same species should be found in Ceylon. Altho the Ceylon specimen is undoubtedly a *Cryptothrips* and remarkably similar in size and color to *C. floridensis*, a close examination reveals differences in the shape of the thorax and the antennal segments. The Ceylon specimen is probably a distinct but closely related species.

The injury inflicted on bay is similar to that on camphor but less severe. There is the same destruction of the new terminal growth but fewer and less severe bark lesions. The larvae seem to feed more on the leaves and less on the bark than when attacking camphor. Following the destruction of the terminal bud the lateral buds develop freely, resulting in a sort of witch's broom or "multiple bud" growth. The withered terminal shoots cling to the tree longer than do those of camphor and form retreats in which the thrips commonly hide. These dead twigs are the most likely places in which to search for the insects.

Thus far the larvae have been found on only the shore bay, *Tamala littoralis*, but trees of *Tamala barbonia* about Gainesville show typical thrip injury. The avocado belongs to the genus *Persea* to which genus the bays have been commonly referred. Upon the discovery that the latter were the native hosts of the thrips, some apprehension was felt lest the insects might be able to feed also on avocadoes and ultimately perhaps to invade the avocado orchards of the state. In the laboratory, however, they have refused to feed on young growth of the Mexican avocado.

The life history of the camphor thrips has not been worked out in detail. A single generation was raised in May 1913. The eggs hatched in eight or nine days and the larvae had become adults by the 24th day.

Contrary to our previous experience we have lately observed the insect to fly. The flight was, however, very short. That it does not commonly fly far is indicated by the fact that camphor trees less than a half mile from a center of infestation have remained free for years. A hedge near the writer's home at Gainesville is still uninfested, altho a colony of thrips has for six years existed within a half mile and for the past year within 900 feet. This hedge borders an unused alley where opportunities for transportation are few. Trees along the neighboring street where traffic is heavy have become infested.

J. R. WATSON (Ag. Exp. Sta.).

MOSQUITOES FOUND ABOUT GAINESVILLE, FLA.

(Continued from page 23)

The length of life of the adult is variable. They must live for at least a week after biting before they can transmit malaria. In the north, they hibernate as adults in cellars, barns, etc. (Howard 1911). They fly only short distances. In the work at Panama, three hundred yards from the breeding points has proved to be safe.

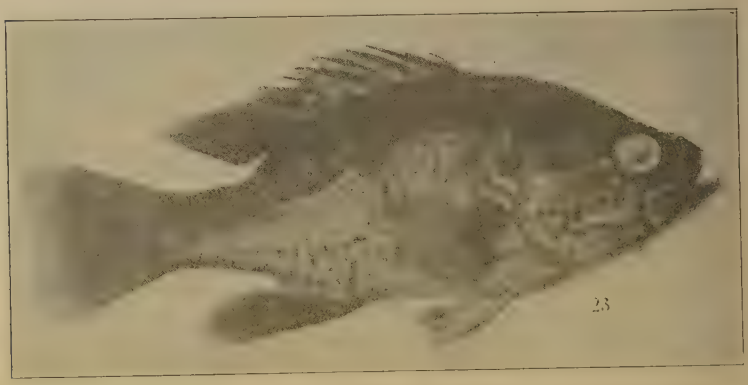

PLATE IV. (23) Warmouth Bass *(Chaenobryttus gulosus)*.

Anopheles usually bite only at night and this point has been emphasized in protection from malaria, but both *A. crucians* and *A. quadrimaculatus* have bitten in the late morning in the Experiment Station toilet.

BREEDING PLACES

Larvae have been taken in the edge of marshes, in road ditches, basements, pools, and several other places that were a mile or more from the University. They have been several times taken with Culex larvae.

STEGOMYIA

Eggs.—The eggs are laid singly as with Anopheles. They are black in color, conically elongated, and are covered with a reticulated membrane which collects air and gives them buoyancy (Berkley 1902, Art. by Dr. Agromonte). They usually hatch in from fifteen hours to three days, but will stand desiccation for a day or two and remain viable for at least a month (loc. cit.).

Larvae.—The larvae closely resemble those of Culex, but are larger, less active, and remain below the surface much longer. The anal tube is somewhat shorter and thicker than Culex, being about three times as long as wide, and tapers regularly. The anal tube bears but one pair of tufts and has the teeth of the pecten evenly spaced. The antennae do not taper apically and the tuft is placed at or before the middle. The length of the larval stage varies from eight to twenty days.

Pupae.—The pupae (Fig. 20) resemble Culex, but are larger. They remain as pupae two or three days.

Adults.—The adults are easily recognized. They have the legs and abdomen conspicuously banded with white and the dorsum of the thorax bears a lyre-shaped area of white, though this is sometimes inconspicuous. They fly and bite only during the day.

BREEDING PLACES

The larvae of this species have been found in an old pot, tin cans, and in pans in the laboratory.

PSOROPHORA

The eggs are large, spined, and laid singly. The larvae are much like Culex, but can soon be distinguished by their large size, being over one-half of an inch when full grown. They are cannibalistic and feed upon larvae of Culex, Anopheles, and the smaller ones of their own species. (Berkley 1902.) The adult of *P. ciliata* is easily recognized by its large size and the bands of erect scales on the legs. *P. Floridense* looks very much like Stegomyia, but so far as I have observed, they fly and bite only at night. Neither species are ordinarily troublesome here. No local breeding places have been found.

(To be continued in Nos. 3 and 4. No. 3 will contain Mosquitoes and Disease, Natural Enemies, and Preventives; No. 4, Part II, Traps for Mosquitoes.)

PERSONALS

Announcements of the marriage of Mr. A. C. Mason of the U. S. Ent. Laboratory at Miami to Miss Mary McConchie, at Paris, Ill., have been received.

Mr. C. A. Bennett has established his laboratory for the camphor thrips work at Satsuma. With J. R. Watson of the Fla. Exp. Station, who has been made colaborator in the Bureau on this project, he has recently made a trip to Macclenny, Glen St. Mary, and Monticello.

Mr. K. E. Bragdon is at present supervising the inauguration of a general survey of the peninsular section of Florida for the purpose of finding whether or not the sweet potato weevil has become established at interior points.

Mr. W. R. Briggs has recently been appointed County Agent for Manatee County, with headquarters at Bradentown.

Mr. A. C. Brown recently participated in the boll weevil investigations conducted by the State Plant Board in the northern part of the state.

Mr. Clarence A. Bass, until recently in the navy, is at present in Baltimore, recuperating from an operation. Upon his recovery he is expected to resume his position with the State Plant Board.

Mr. Milledge M. Bass recently resigned from the position of District Inspector for the State Plant Board to accept a position as manager of a large citrus property belonging to the Standard Growers' Exchange, located near Fort Myers.

Mr. Eli K. Bynum has been granted a leave of absence of several weeks by the State Plant Board, in order to attend to personal business affairs at his home at Satillo, Miss.

Mr. Virgil Clark is now in western Florida making re-inspections of citrus properties formerly infected with citrus canker, this work being done jointly by the State Plant Board and the Bureau of Plant Industry, U. S. D. A.

Mr. Howard G. Carter recently resigned as District Inspector for the State Plant Board. He will henceforth devote his time and attention to his fruit-growing properties in southern Dade County.

Mr. E. F. DeBusk, County Agent of Orange County, has announced his forthcoming resignation. It is understood that he will engage in commercial work.

Mr. B. F. Floyd, Plant Physiologist of the University of Florida Experiment Station, has resigned for the purpose of entering commercial life. He will have charge of the insecticide work of the Wilson-Toomer Company.

Mr. Wm. Gomme is now County Agent of Polk County.

Mr. Chas. M. Hunt, Assistant Nursery Inspector for the State Plant Board, is now located in the Nursery Inspector's office at Gainesville.

Mr. Neal E. Hainlin is now engaged in the citrus canker re-survey work and is located in the northeastern portion of the state.

Mr. K. S. Lamb, formerly Asst. Quarantine Inspector with the State Plant Board, is now occupying a position as traveling salesman for the Loose-Wiles Biscuit Co.

Mr. Harold Mowry, Asst. Quarantine Inspector for the State Plant Board, is now located at Key West.

Mrs. N. M. G. Prange, of Jacksonville, was one of the enthusiastic attendants at the recent Citrus Seminar at Gainesville.

Mr. Wilmon Newell, Plant Commissioner, attended conferences, regarding the European corn borer, at Albany, N. Y., and Boston, Mass., on August 28th and 29th. He afterwards visited Riverton, N. J., and made a personal investigation of the Japanese beetle infestation at that point.

Prof. S. I. Kuwana, Government Entomologist of Japan, recently visited Florida. At Orlando he visited the Bureau of Entomology Laboratory in charge of Mr. W. W. Yothers, at Tampa he investigated the quarantine work of the State Plant Board, and at Largo the citrus canker eradication work, after which he spent two days at the University of Florida Experiment Station and the State Plant Board offices at Gainesville.

Mr. L. Russell Warner, Asst. Quarantine Inspector for the State Plant Board, is ill with typhoid fever at Key West. Fortunately his condition is not considered as critical and hopes are entertained for his steady recovery.

Mr. Frank Stirling installed and had charge of an exhibit for the State Plant Board at the West Florida Fair, at Marianna, October 28th to November 1st.

Mr. D. N. Reynolds is at present assisting the farmers of western Florida and particularly those of Jackson and Liberty Counties in dealing with the mosaic disease of sugar cane.

Mr. A. L. Swanson is heading a small party of inspectors assigned by the Plant Commissioner to the task of determining to what extent the mosaic cane disease may have become established around Lake Okeechobee.

Dr. C. F. Hodge has accepted an appointment with the new Extension Division of the University and is a most welcome addition to our meetings.

STRATEGUS WANTED—Am making a special study of this genus, of the Scarabeidae, and should be very glad to receive Florida specimens, especially of the rarer species. Will exchange or pay cash. Address W. Knaus, McPherson, Kansas.

A NEW PHYSOTHRIPS FROM OREGON

J. R. WATSON

A small collection of thrips collected by Prof. A. Burr Black and sent to the writer contains specimens of an apparently undescribed species.

Physothrips blacki, n. sp.

♀. General color brown, a slight tinge of orange on the thorax of some specimens.

Measurements: Total length 1 mm. Head length .09 mm., breadth 0.15 mm.; prothorax: length 0.13 mm., breadth (including coxae) 0.17 mm.; mesothorax: breadth 0.24 mm.; metathorax: breadth 0.21 mm.; abdomen: breadth 0.26 mm. Total length on antennae 0.22 mm. Segment 1, 25; 2, 33; 3, 37; 4, 36.5; 5, 32.5; 6, 42; 7, 7; 8, 14 microns.

Head considerably wider than long; cheeks slightly convex, sparsely hairy; vertex with several very distinct cross striations; no large postocular bristles, but a row of 8 small bristles extends across the vertex behind the eyes; a long spine in front of each posterior ocellus. *Eyes* large bright red by reflected light, occupying over half the length of the head and two-thirds the breadth, sparsely pilose, facets large. *Ocelli* very large, posterior margins of the posterior pair even with and near the posterior margins of the eyes, bordered on the inner sides by heavy pigmented crescents. Anterior cellus directed partly forward, bordered posteriorly by a large pigmented area. *Mouth-bone* long and pointed, reaching nearly or quite across the prosternum. *Antennae* 8-segmented, 1 and 2 almost as dark as the head, 2 often darker than 1; 3 and the base of 4 light-brownish yellow, remainder light brown. Spines and sense cones short and colorless but some of the latter heavy.

Prothorax squarish, sides slightly convex and diverging posteriorly. Posterior angles rounded and provided with a pair of heavy bristles. The anterior angles bear only very short bristles. *Mesothorax* with very convex sides, no large bristles. *Metathorax* with sides nearly straight and parallel. *Legs* rather long, except for the lighter tarsi, nearly concolorous with the body. Fore legs often lighter than the others. Fore *wings* light brown; veins bearing prominent bristles; 11 or 12 on the fore vein, 8 or 9 near the base, 2 in the center and one near the apex; 11 or 12 on the posterior vein, none on the base; fringing hairs stout but rather short and sparse. Hind wings colorless.

Abdomen elliptical, tapering acutely to the base. Spines short on the anterior segments and those on the posterior less than ⅔ the greatest width of the abdomen.

♂ Smaller than the female. Some specimens are considerably lighter in color, especially the antennae and legs. The latter are sometimes yellow.

Abdomen widest at the base; well rounded posteriorly. The last segment bears several pairs of strong but short bristles.

Measurements: Total body length .87 mm.; head: length .086, breadth .134 mm.; prothorax: length .107 mm., breadth .155 mm.; mesothorax .202 mm.; abdomen: width at base .156 mm.; antennae: total length .187; segment 1, 18; 2, 30; 3, 34; 4, 34; 5, 28; 6, 39; 7, 6; 8, 12.5 microns.

Described from six females and 12 males collected from California poppy and dandelion at Corvallis, Oreg.

REPORTS OF MEETINGS

Aug. 4 (Adjourned meeting). Meeting was called to order by Vice President Merrill at 5 p. m. with the following members present: Geo. B. Merrill, P. W. Fattig, J. R. Watson, Dr. J. H. Montgomery, J. C. Goodwin, C. M. Hunt, Frank Stirling, O. T. Stone, P. H. Rolfs, and E. W. Berger. Visitors present were Prof. W. L. Floyd, Dr. C. L. Crow, W. L. Goette, Dr. C. F. Hodge and several students of the summer school. The following new members were elected: Miss M. F. Hill, teacher, Trenton; W. J. Schubert, of Armour and Co., Jacksonville; E. F. DeBusk, County Agent, Orlando; Dr. C. F. Hodge, instructor in summer school; and W. L. Goette, teacher, Eustis.

The address of the evening by Dr. Hodge on "Housefly Control" was listened to attentively. Dr. Hodge exhibited and explained his fly trap and gave much valuable data on the habits of flies. Flies will usually not travel much over 500 yards if food is available within that area. They may travel even a mile in search of food, and even further over water. The waterworks of Cleveland, Ohio, situated 1¼, 5, and 6 miles from shore were one summer overrun with flies. On the furthest crib the biting stable fly was most abundant and troublesome. On the nearer cribs some blue-bottles were present.

One trap is sufficient for a radius of 100 yards provided all other food is kept out of reach of the flies. One afternoon is sufficient to capture all the flies in such an area.

Dr. Hodge also explained how he got the idea that it was possible to "trap a vacuum" of flies. He had been paying boys to collect flies for feeding young quail. One day while dining with a friend on an open porch of his residence the absence of flies was commented upon and it occurred to him that the boys had caught all the flies. The trap was the outcome of this observation and finally led to his successful attempts at cleaning up the flies in whole cities.

E. W. BERGER, Acting Sec'y.

Sept. 29. Meeting called to order by Pres. O'Byrne at 5 p. m., with the following members present: E. W. Berger, K. E. Bragdon, H. S. Davis, G. M. Hunt, G. B. Merrill, Wilmon Newell, F. M. O'Byrne, Frank Stirling, and J. R. Watson. Visitors present were C. A. Weigel, and C. A. Bennett.

The paper of the evening was by J. R. Watson on the Origin

and Hosts of the Camphor Thrips. After an extended discussion of the paper Mr. C. A. Weigel, who has been conducting a general survey of the thrips situation in Florida for the U. S. Bureau of Entomology, outlined the plans for the camphor thrips campaign about to be undertaken by the Bureau under an appropriation of $5000. Following this Mr. C. A. Bennett, who is to have direct charge of the control work, made a few remarks. Meeting adjourned at 6:30.

H. S. DAVIS, Sec'y.

Some damage is being done by pumpkin bugs and cotton stainers *(Nezara viridula* and *Dysdercus saturellus)* to citrus and other crops. After the adult pumpkin bugs have gotten onto the fruit the only known remedy is to collect them in large nets. The cotton stainers may be killed with a good strong oil emulsion or soap solution sprayed on the trees. Mr. Mosnett has found that spoiled avocadoes cut in half make excellent traps for them. While congregated on the avocado they may be sprayed with kerosene.

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